

Ecotourism: Aspects of its Sustainability and its Compatibility with Conservation, Social and other Objectives.

Abstract

Considers the ecotourism market and its rate of growth and identifies important factors expected to influence the size of this market. Global threats to sustainable ecotourism are highlighted. Definitions of ecotourism are considered and doubts are expressed about the value of normative definitions. Factors likely to influence the sustainability of ecotourism are discussed. The most important are its economics, the extent to which ecotourism is consistent with conserving its resource-base, its social acceptability and its political feasibility. These compatibility aspects of ecotourism are closely linked to sustainability aspects and often call for government intervention in tourism management and development. Considerable attention is given to carrying capacity as a guide to sustainable ecotourism development as well as the difficulties in using the concept in practice. The management of ecotourism on the archipelago of Fernando de Noronha in Brazil provides an interesting example of attempts to manage ecotourism sustainably.

1. Introduction

Ecotourism has become a 'buzz' word in tourism development both because it is believed to be a rapidly expanding segment of the tourism market, and because many conservation groups see it as a means to ensure ecologically sustainable development, or more generally, a way to obtain sustainable development. In order to achieve the latter objectives, tourism must itself be sustainable from an economic, political, social and environmental point of view. This also means that it must be compatible with various economic, political, social and environmental objectives.

Size of the ecotourism market and its growth

Views differ about how rapidly the ecotourism segment of the tourism market is expanding and about how large it is. Nevertheless, it is generally believed that the ecotourism market is growing at a faster rate than tourism as a whole and that it accounts for around 20 per cent of the market for tourism. The WWF (Worldwide Fund for Nature) estimated that \$12

billion of the \$55 billion earned from foreign tourism in developing countries in 1988 was due to ecotourism, and therefore ecotourism accounted for more than 20 per cent of this market (Lindberg, 1991).

Studies of the factors affecting visitation rates to national parks (e.g. Ranken and Sinden, 1971) indicate elements which contribute to growth in ecotourism. These studies suggest that the demand for ecotourism will rise significantly with the following:

- (a) growing income levels,
- (b) rising levels of education,
- (c) increased leisure-time,
- (d) population growth,
- (e) easier, less costly, speedier and safer access to ecotourism sites,
- (f) changing community attitudes towards nature (Passmore, 1974) and
- (g) greater alienation of mankind from nature due to growing urbanisation and domination of man by economic and technological systems (Christaller, 1964).

Other factors contributing to growth in ecotourism are: more comfortable accommodation at ecotourism sites, greater safety of tourists at such sites, mobile communication systems.

Threats to sustainable ecotourism

At the same time as the demand for ecotourism is growing strongly, the availability of suitable ecotourism sites worldwide is dwindling, putting increased pressure on remaining sites and in many cases, threatening their ecological sustainability. Reasons for degradation or destruction of ecotourism sites are many. They include incompatible economic uses of the land area for other economic activities (such as agriculture, industry, mining and

urbanisation), inappropriate tourist development and infrastructures, destruction by tourists, numbers of tourists in excess of the carrying capacities of sites, and adverse environmental externalities or spillovers which destroy ecotourist assets, such as coral reefs or choke water bodies with weeds. As the global population rises and demands for ever greater material wealth continue to escalate, threats to the sustainability of ecotourism sites grow.

2. What is Ecotourism?

Possibly the earliest definition of ecotourism was given by Hector Ceballos-Lascurian who described it as “tourism that involves travelling to relatively undisturbed or uncontaminated areas with the specific objective of studying, admiring and enjoying the scenery and its wild plants and animals, as well as cultural manifestations (both past and present) found in these areas” (Boo, 1990).

In practice, ecotourism has become identified with tourism dependent on natural environments (both living and non-living) and with any indigenous cultures closely connected to such environments. Just where to draw the boundary between ecotourism and other forms of tourism is unclear. For example, beach-based tourism and recreation depend heavily on *some* natural resources, but not exclusively. While many would not consider beach-based tourism to be a form of ecotourism, it raises many similar issues about policy as arise in clearcut cases of ecotourism as in the case of national parks such as Lamington National Park and Carnarvon Gorge National Park in Queensland; the need, for example, not to destroy or seriously degrade the natural resource-base on which this tourism and recreation depend.

Some writers further restrict the application of the term ecotourism to forms of nature-based tourism which are non-consumptive and careful of their surrounding natural environments.

The exploitative use of nature or environmentally unfriendly use of nature for tourism, would not be regarded by this group as ecotourism.

Some writers would add even further restrictions if tourism is to qualify as ecotourism.

They require:

- (a) environmental education to be a part of this type of tourism (Boo, 1990) and
- (b) that it should provide economic benefit to the local community (Ziffer, 1989).

While both these requirements are desirable, they unduly restrict the study of tourism based on natural environments. A wider view is taken here: I shall regard ecotourism as tourism which is heavily dependent on natural environments.

Nevertheless, the above characteristics of ecotourism are not inconsequential. Environmental education can be a powerful force in reducing environmental damage (Forsyth et al., 1995). Such education can be directed to tourist operators as well as to tourists themselves. If directed to tourist operators, they may transmit this information to tourists. Such education may provide information about how to treat the environment and knowledge about the environment itself. Furthermore, both from an equity point of view and from a political one, it is important for local communities to gain from ecotourism developments. Without such a gain, local communities have no incentive to take care of the natural resources on which ecotourism depends, and considerable social conflict can be generated.

Views about what constitutes (acceptable) ecotourism range from those who would impose minor restrictions on the conservation of the natural resource-base to those, with a deep ecology bent, who would impose major ones. Conflict can occur between individuals at the

opposite ends of this spectrum.

Some individuals define ecotourism only in terms of the type of tourism which they perceive to be *good* or *desirable*, so their definitions are normative. The same is also true of some definitions of sustainable development. While it is necessary to consider what types of tourism are ecologically or environmentally desirable, I would prefer a positive definition of ecotourism, with the desirability of the type of ecotourism which emerges being considered separately. Otherwise, the positive aspects of such tourism may not be considered. Furthermore, the desirable characteristics for tourism may be so restrictive that they cannot be met or are rarely able to be satisfied.

3. The Sustainability of Ecotourism

The sustainability of ecotourism, the measurement of which is subject to controversy (Driml and Common, 1995, Tisdell and Wen, 1997a,b), can be expected to depend on the following:

- (a) its economics,
- (b) the extent to which it is consistent with conserving its resource-base,
- (c) its social acceptability and
- (d) its political feasibility.

Economics

Ecotourism will not be sustained if it is unprofitable for ecotourism operators. In a world dominated by economics, the profitability of any ecotourism development has to be considered carefully, (some important factors to take into account are outlined in McNeely

et al., 1992) and unprofitable ecotourism operators will only be sustained if they are subsidised by governments. With increased emphasis on structural adjustment policies, favoured by bodies such as the World Bank, such subsidies are harder to obtain nowadays. Nevertheless, there are often sound social economic reasons to subsidise the management and conservation of a natural resource-base used for ecotourism, such as a national park. The beneficiaries from the conservation of a natural area may include individuals who do not visit the site, so there are environmental spillovers or externalities.

There are often unrealistic expectations about the capacity of ecotourism to be profitable (Tisdell, 1995). Even if the user-pays principle is adopted, ecotourism need not be profitable. There may be insufficient demand for the tourist facility for example, or an ecotourism project may be developed in an uneconomic manner.

Whether or not governments should subsidise tourism operators using such resources or themselves be involved in unprofitable ecotourism operations is more debatable. The result could be that funds are diverted away from conservation management. On the other hand, political support for preservation of the ecotourism site involved may grow as a result of greater use of the site by tourists and by tourist operators.

For example, in China public authorities have sometimes invested in facilities such as hotels to exploit ecotourism. But in some cases, losses have been incurred, and funds have had to be diverted from other activities to cover these losses and loan repayments. In some instances, funds have had to be diverted from national park management to cover such losses.

Nevertheless, some authorities may be quite prepared to make a loss on their ecotourism activities. The authority may argue that its support of ecotourism provides greater political support for the authority and in the longer run this translates into a higher level of public funding for the authority.

Environmental conservation

While ecotourism development sometimes provides a profitable way to conserve a natural area, it can also degrade the area, thus coming into conflict with the nature conservation goal, and possibly in the longer term making the area unattractive for tourism. Again some ecotourists seek a wilderness experience and too many tourists can detract from this. There are various policies and management techniques which can be used to respond to these issues. The urgency of developing and implementing policies to deal with such issues will depend on the level of demand to use an area for tourism and its carrying capacity(ies), discussed below.

Social Acceptability

Social acceptability of ecotourism, particularly by local communities, can also influence its sustainability. Social acceptability is likely to be related to perceived economic benefits to local communities. In some cases, local communities are hostile to ecotourism development (consider Mishra, 1982, in relation to Chitwan National Park) because they believe they get little economic gain from it and that it is a threat to their lifestyle and livelihood. Furthermore, they may be excluded from using resources which they used traditionally or maybe otherwise restricted in their economic activities, so as to conserve natural resources to support ecotourism.

Political sustainability

Politics also influence the sustainability of ecotourism, particularly the conservation of the natural resources required to support ecotourism. In the absence of adequate lobby groups in favour of such conservation, areas suitable for ecotourism may be used for economic activities incompatible with the development of ecotourism. Views vary about effective strategies to obtain sustained political support for ecotourism and conservation of the natural resources on which it depends. For example, one view is that some use of these natural resources is needed to ensure that politically they continue to be conserved at all. For example, tourism-use even when not completely compatible with conservation of the natural environment may be fostered for this reason. Or *some* consumptive-use of natural resources may be allowed, e.g., commercial fishing in designated zones in the Great Barrier Reef Marine Park in Australia (Tisdell and Broadus, 1989), or traditional users of an area may be allowed to use it for traditional purposes. On the other hand, there are those who feel that all consumptive-use is to be resisted because it is likely to lead to escalating demands to use the natural resources of a protected area. Hence, the politics of natural resource sustainability is complicated.

4. Compatibility and Policy Issues

Compatibility and sustainability aspects of ecotourism are closely linked. Indeed, it is mainly because certain incompatibilities or contradictions arise that ecotourism is likely to become unsustainable. It may for example, be incompatible with the making of profit, with the conservation of nature once carried beyond a point, with social mores and political realities. It is incompatible with the intensive-use of land for economic purposes and with the presence of other industries which have an adverse impact on the natural environment.

The effects of economic activities just indicated may be indirect. For example, in some situations acid rains generated by industry may alter vegetation cover. Or nutrient-enrichment of water bodies as a result of leaching of fertilisers used in agriculture, e.g., for the growing of sugar-cane, and from human sewerage, may stimulate the growth of water-weeds and algae. Lakes, coral areas and even beaches may be adversely affected by such phenomena.

Self-destruction of tourism

In addition, a nature-based tourism itself may be self-destructive. Tourists for example in Phuket, Thailand collect coral pieces and the anchors of tourist boats destroy corals (Tisdell, et al., 1992). Effluent from hotels along the seafront fosters algal blooms which kill coral. In some cases also, silt-laden waters as a result of nearby tin-mining enter the sea and block out the sunlight required by corals, so adding to their destruction. One could easily add to the list of such effects. In Bali, Indonesia, for instance effluent from seaside hotels has also had an adverse impact on corals and in Okinawa and nearby islands in Japan, fertilizer leached from golf courses has similar consequences.

Ecotourism may become self-destructive through another mechanism. Once an area becomes a profitable ecotourism destination, an ever-increasing number of tourist developers may wish to share in it. As numbers increase, the tourism resource-base is eroded and the profits to other tourism operators decline. Each new entrant may gain but the total loss inflicted on existing tourist operators may exceed this gain, and the total benefits to tourists may eventually decline. Because of spillovers, the problem is like that of the prisoners' dilemma problem which is well known in game theory. Thus some government regulation of tourist development in ecotourist areas is required.

Government intervention in tourism management and development

There is little alternative to government and community intervention in the management of ecotourism, even though this cannot be expected to give perfect results. In some cases, the government needs to limit the number of tourists and tourist operators in an area, improve the patterns or logistics of tourism movements to reduce environmental damage or adverse effects, introduce technological improvements to reduce environmental damage, e.g., board walkways, asphalt paths, impose restrictions on buildings, provide appropriate environmental education to tourist operators and tourists. In addition, in order to increase the social acceptability of tourism and take advantage of local knowledge, it may be worthwhile involving local communities in the management of ecotourism resources.

Actual mechanisms for regulating tourist numbers and/or the number of tourist operators can vary considerably. These include fees or charges, taxes and permits and these can also be diverse in nature. It is not possible to discuss the merits and the drawbacks of these alternative instruments here.

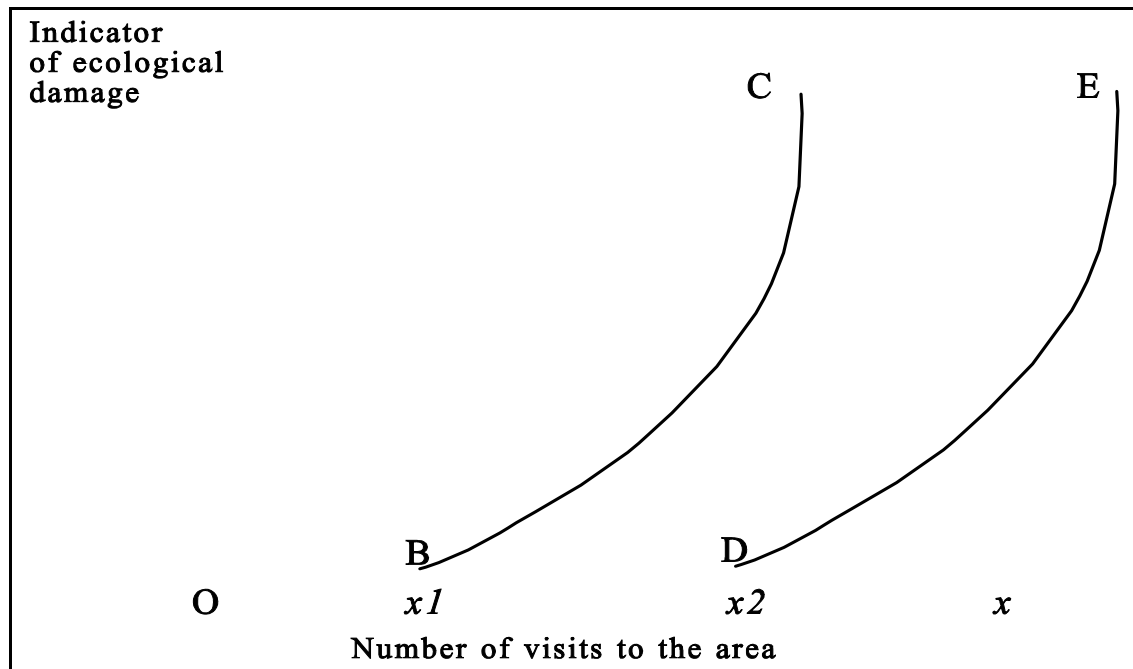
Carrying capacity

It might be noted that there has been much interest in concepts of carrying capacity as guides to the management of ecotourism. While it is useful to recognize limits to the carrying capacity of natural areas used for ecotourism, the concept is not a straight forward managerial tool. Dissimilar carrying capacities may apply to different characteristics of a tourism site and carrying capacities may not be discrete or definite (Tisdell, 1988). Despite these qualifications, it is important to take into account the interactions between tourism and other variables at a site, such as the quality of its environment. Some sites may be ecologically so fragile or so sensitive to human intrusion, that tourism should not be allowed

or should be severely restricted, especially if the site is required for incompatible scientific research. The environmental fragility of sites needs to be considered, both in planning ecotourism development and in managing ecotourism. Care is needed and appropriate precaution is required.

As mentioned, the concept of carrying capacity is an elusive tool for managing ecotourism, and its application can involve considerable subjectivity. This was recognized early in the literature on tourism management, for example by Mathieson and Wall (1982). The concept seems to have originated from models for determining the equilibrium of the population of a species in relation to its environment. However, this concept does not translate readily into one for the carrying capacity of an area for ecotourism.

The relationships between the volume of its tourists visiting an area and the state of its ecosystems, the physical condition of its environment, social impacts and the total utility obtained by visitors may all be of different forms. For example, total utility obtained by visitors may continue to rise with an increase in the number of visitors even after ecosystems show some deterioration or the physical state of an area declines. This non-uniqueness was highlighted by Mathieson and Wall (1982, p.21) in the following terms: “A recreation site or tourist resort, be it natural, man-modified or man-made, does not have a set carrying capacity. The capacity will reflect goals established for the site or resort, and these should specify the level of environmental modification which is unacceptable and the nature of the experiences to be provided”. Furthermore, not all aspects of an ecosystem or of ecosystems in an area are equally fragile – some may begin to deteriorate rapidly when the number of visitors is low, whereas others may not decline until the number of visitors reach a high level. Therefore environmental impacts are usually mixed and some judgment is required



about the relative importance of each.

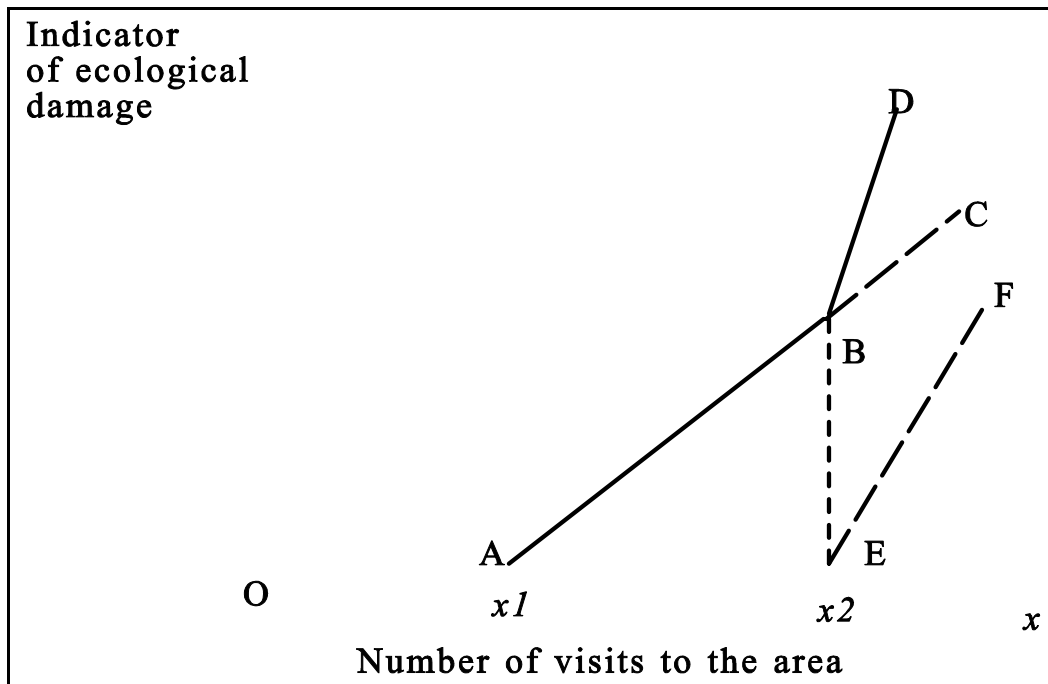
Nevertheless, for illustrative purposes, let us suppose that our sole concern is with the ecological carrying capacity of a site and that an ecological damage function can be identified which depends on the number of visitors to the site. Suppose that the ecological damage function is of the form OBC shown in Figure 1.

This indicates that for up to x_1 visitors per unit of time to the site no significant ecological damage occurs but beyond this level noticeable ecological damage occurs. Hence, x_1 is a threshold and represents the carrying capacity of the site if no ecological damage is to occur.

As mentioned earlier, carrying capacity can sometimes be increased by technological changes or improved management of tourists in an area. The effect of this is to shift the

ecological damage function to the right. Thus, after such a change, the ecological damage function might alter for example from OBC to ODE and thus the carrying capacity of the area increases from x_1 to x_2 .

Different ecosystems or ecological features may exhibit differing degrees of resistance to damage. Again for simplicity suppose two ecological features, *I* and *II*. The damage function for feature *I* might be as indicated by curve OABC and that for system *II* as shown by curve OEF in Figure 2. Damage to ecological feature *II* does not occur until visitors exceed x_2 per period of time. If the damage functions are additive, the total ecological damage function is as indicated by curve OABD. What is the carrying capacity of the site in this case? If ecological feature *I* is considered to be unimportant but keeping feature *II* in a pristine state is important, then x_2 is the relevant carrying capacity. Judgment however is required. The deterioration in ecological aspect *I* at x_2 may be considered by the managers



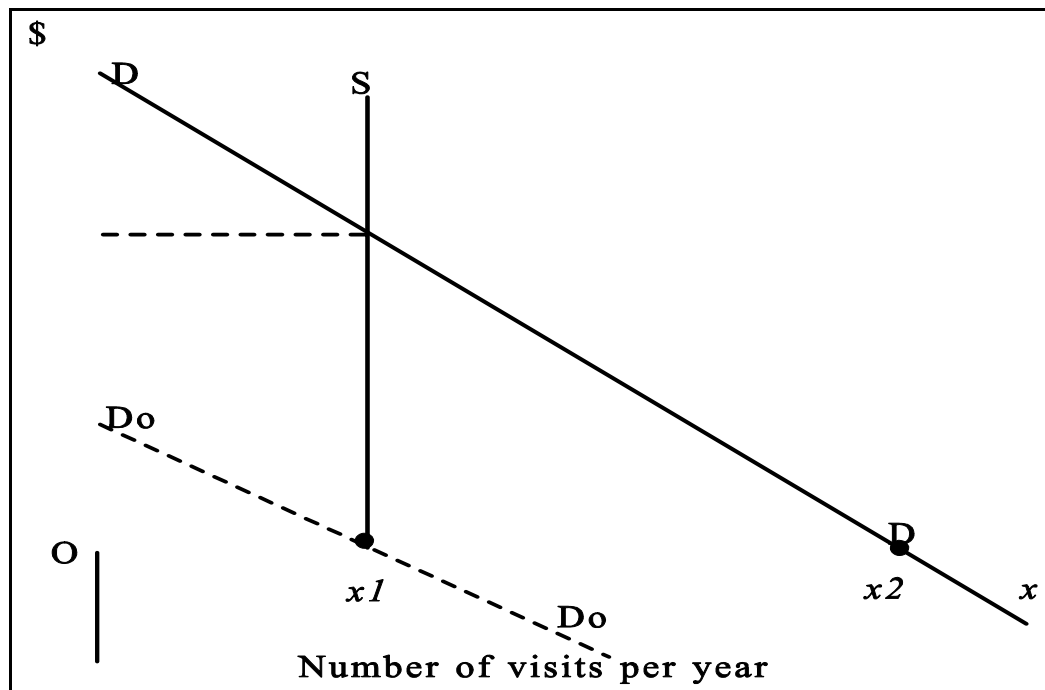
of an area to be too great, so some intermediate number of visitors between x_1 and x_2 may be aimed for. In most cases where the concept of carrying capacity is being applied, judgment and valuation cannot really be avoided. However, this case only indicates the tip of the iceberg.

This is confirmed by a recent article by Lindberg et al., (1997) in which they state that “though carrying capacity is an intuitively appealing concept, it is simply not adequate to address the complexity found in tourism situations”. They argue that it needs to be replaced by alternative planning and tourism management frameworks some of which they list (Lindberg et al. 1997, p.463). Nevertheless, the concept continues to have proponents (Williams and Gill, 1994; McNeely et al., 1992) even though it is not a scientific objective notion but rather a value-laden management concept (Cf. Stanley, 1979). Given its flaws, Lindberg et al. (1997, p.463) recommend that the concept be avoided.

Despite this, carrying capacities are sometimes determined for natural areas and the number

of visitors restricted to these. Once a carrying capacity is determined the question then arises of how to limit the number of visitors so as to meet the carrying capacity restriction. In practice a number of solutions are possible. These include the charging of an appropriate fee to use the area, rationing by the issue of permits or rights to use the area or a combination of these. There are also different types of rationing devices with different consequences.

This matter can be illustrated by Figure 3. There the line DD represents the demand to use an area for tourism and x_1 is the designated carrying capacity of the area. If there are no restrictions on tourism in the area, the annual number of visitors to the area will be x_2 which



exceeds its carrying capacity.

The desired carrying capacity could be achieved by charging a tax or price of P_0 per visit to the area. Alternatively a lower price might be charged and the x_I allowed visits rationed, or no charge might be levied and the allowed visits allocated entirely by a rationing system. (Cf. Lindberg et al., 1997, p.463).

Note that no restrictions on visits would be needed if the demand curve for visits happened to be D_0D_0 or less. As accessibility increases and other factors raise the demand to use ecotourism sites, the probability rises that the carrying capacity of the site will be exceeded unless measures are adopted to restrict the number of visits. It is interesting to observe that in some cases, management authorities actually make it more difficult to reach an area than it need be and do not advertise the area because they wish to keep the demand for its use for tourism low. On the South Island of New Zealand, access to some national park areas is not made easier for this reason.

One interesting way to manage an ecotourism area may be mentioned in relation to the Great

Barrier Reef in Australia. The authority in charge allocates different reef areas to different tourist operators for scuba-diving and similar types of marine-based tourism activities. These property rights remain in place for a specified time. Such property rights put the onus on tourism operators to take care of the environment and they are likely to find it in their interest to do so. While a solution based on property rights is not always practical, it will be useful in some cases.

5. Fernando de Noronha and Ecotourism

Fernando de Noronha in Brazil provides an interesting study of aspects of the sustainability and compatibility of ecotourism with social and ecological objectives. It is an archipelago consisting of 21 islands located in the Atlantic Ocean 525 kms northeast of Recife and 350 kms east of Natal, cities are on the mainland of Brazil (see Figure 4). Located in the tropics, this archipelago is volcanic in origin. In 1980, it was incorporated into the state of Pernambuco although this is not the closest Brazilian state but at the same time the archipelago retains its own administration.

Until 1988, Fernando de Noronha was a military base and contained a prison to which some Brazilians were banished. Now the main source of income for the local population of Fernando de Noronha is tourism. A management plan has been developed to ensure that the archipelago does not become overdeveloped and that it can support ecotourism in a sustainable manner. An important element in this respect was the decision to establish the Fernando de Noronha Marine National Park in 1988 (see Figure 5) which encompasses the major part of the archipelago. This, however, was not sufficient to sustain ecotourism.

Several of the natural environments of Fernando de Noronha are fragile. Therefore, tourist

access is restricted in some parts of the park. Tourists are also warned not to bring plants and animals to the archipelago. The *toju* lizard which was introduced from the mainland has already had an adverse ecological impact in the archipelago.

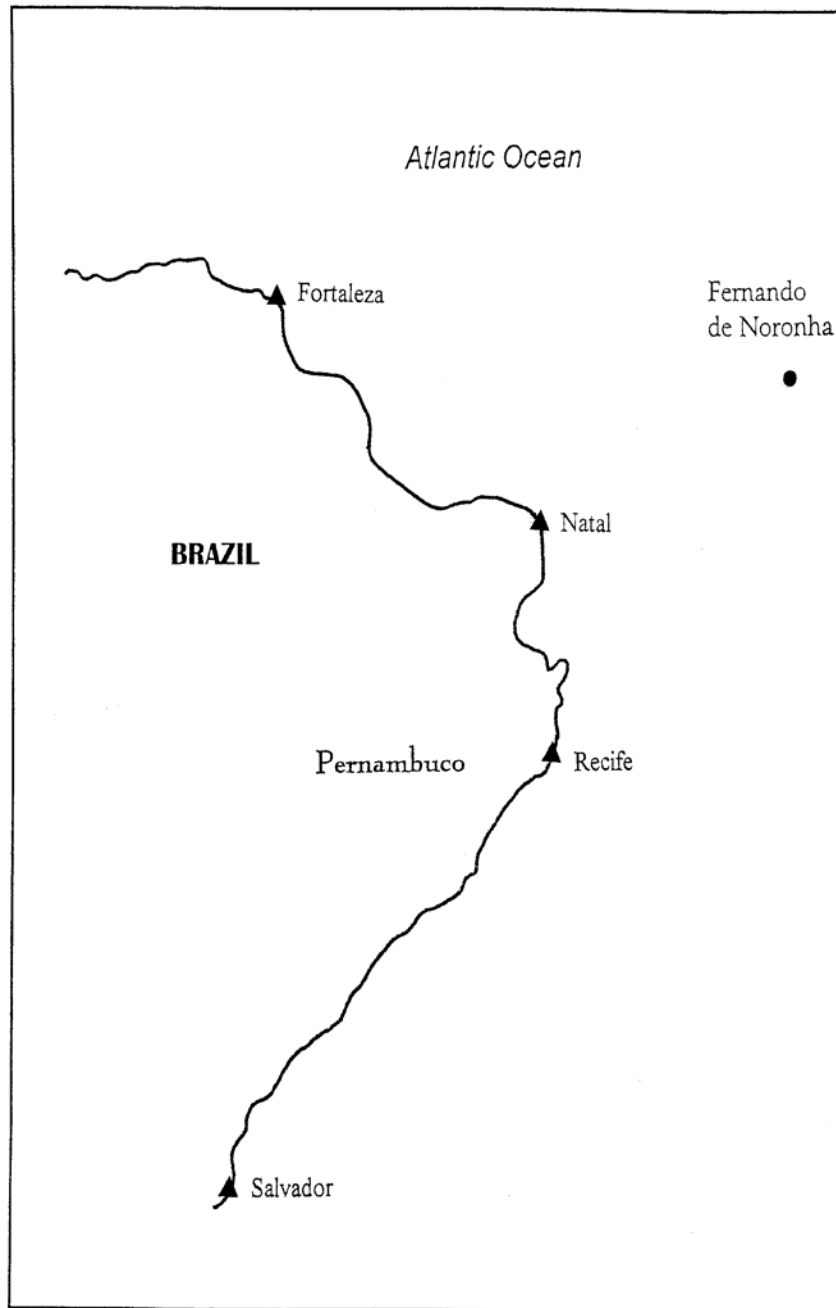


Figure 4: General map showing the location of Fernando de Noronha archipelago in relation to the mainland of Brazil.

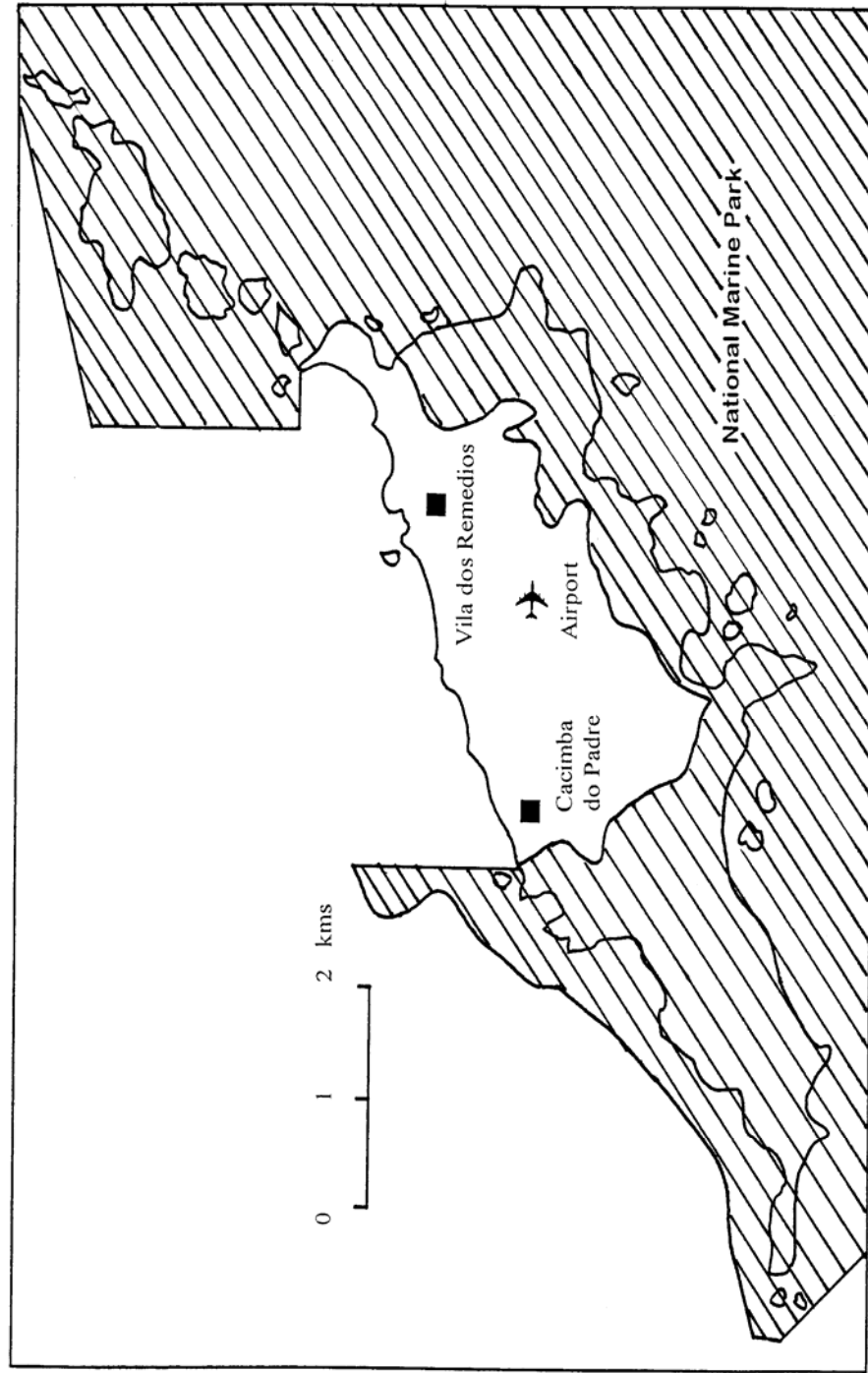


Figure 5: Map of Fernando de Noronha archipelago, Brazil, showing the National Marine Park.

In recent times, limits have been placed on the number of visitors to the archipelago. Not more than 150 visitors are permitted to come to the archipelago each day. Visitors must have a permit and are charged a daily fee for the duration of their stay on the archipelago. The daily fee payable for a stay is on a rising scale. It is \$20 per day for the first four days, rising to \$40 per day for the next two days and so on (Personal communication, S. Pagano, November, 1997). The fee is intended to deter long-term stays for social reasons. Before a fee was introduced youths tended to come to the archipelago and remain there. They were often unemployed and created social problems. One of the reasons for introducing a fee was to deter such youths from coming to the archipelago (S. Pagano, Personal communication, November, 1997).

If such visitor fees are absent and there is only one carrier, or a few carriers in economic collusion, (as may be so for travel to some islands of the Great Barrier Reef), carriers may be the only ones to skim off tourism rents. With the introduction of visitor fees, their monopoly profit is likely to be reduced and some of the tourism rent is now appropriated by a public authority. In this case, the fees collected from tourists are received by the Administration of Fernando de Noronha but management of the marine park is financed by the Federal Government of Brazil.

Draffen et al., (1996, p. 517) claim that “tourism has proved a mixed blessing for the local economy and a bane for the ecosystem of the archipelago. Rapidly growing numbers of visitors have prompted locals to convert mangrove swamps into plots for cultivating more food, thereby depriving marine life of important breeding grounds and food sources”. However, there are virtually no other means available to residents of the archipelago to

obtain income other than from tourism and government transfers of income.

Even this simple Brazilian case indicates the complexity of the carrying capacity/sustainable tourism concepts, which as is specifically pointed out by Perrings et al. (1995), Ch.1), are closely interlinked. The limits on the number of tourists allowed to visit Fernando de Noronha appears to have been determined by a combination of ecological, social and public revenue considerations, all of which entail value judgments but which of course should also take account of scientific/objective relationships. Tourism management in the archipelago does not rely solely on limitations in the number of visitors, e.g. visits are restricted to some areas of the national park.

6. Concluding Comments

The ecotourism market appears to be expanding at a faster rate than that for tourism generally which itself is experiencing rapid growth. Factors have been identified which stimulate the growth of ecotourism. Even though ecotourism expands rapidly, there are many threats to its sustainability and expansion. Ecotourism depends on natural environments (both living and non-living) and any cultures closely connected with these. However, there are many different definitions of ecotourism so one has to be careful in dealing with the subject to determine which definition to use, especially if one is measuring the size of the ecotourism market.

The sustainability of an ecotourism development or project can be expected to depend on its economics, the extent to which it is compatible with the conservation of its resource-base, its social acceptability and its political feasibility. Sustainability and compatibility aspects of ecotourism are closely linked. Ecotourism development may not be compatible in some

areas, with profitability, for example, or with appropriate levels of conservation and therefore may prove to be unsustainable. Or other economic developments may be incompatible with the sustainability of ecotourism in an area. Consequently, government intervention in the management and development of ecotourism is often required.

Much hope has been placed in the possibility of using the concept of carrying capacity to manage ecotourism. However, it is not a straightforward operational concept. Its application usually requires some valuations and value judgments to be made and often these are unavoidably subjective. Nevertheless, carrying capacity constraints are sometimes imposed. Once a carrying capacity is determined, it is necessary to adopt measures such as the imposition of entry fees or allocation of permits to ensure that it is not exceeded. A combination of these measures have been adopted to manage ecotourism in the archipelago of Fernando de Noronha in Brazil in an attempt to achieve social compatibility, foster sustainable ecotourism, and raise public revenue. Overall, this paper identifies diverse factors that must be taken into account in managing ecotourism so that it will be sustainable and highlights the difficulties of such management.

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